

Swift Observation of GRB 100115A

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1 Introduction

BAT detected GRB 100115A at 11:15:19UT (Cummings, *et al.*, *GCN Circ.* 10325). This source was found during ground analysis of BAT Slew Survey data. ToO observations were requested and Swift XRT and UVOT observations began 40ks after the BAT trigger (Target ID 020126). A source was detected by the XRT (Margutti, *et al.*, *GCN Circ.* 10326), but no new source was detected by UVOT (Oates, *et al.*, *GCN Circ.* 10327). Our best position is the UVOT-enhanced XRT location $RA(J2000) = 3.67333 \text{ deg}$ (00h 13m 28.16s), $Dec(J2000) = -0.8265 \text{ deg}$ (-00d 49' 35.4") with an error of 4.0 arcsec (radius, 90% containment). Observations were also performed by SARA (Updike, *et al.*, *GCN Circ.* 10328 & Kann, *et al.*, *GCN Circ.* 10332), NOT (Jelinek, *et al.*, *GCN Circ.* 10325 & 10331) and Gemini-N (Cucchiara, *et al.*, *GCN Circ.* 10335). NOT proposed three sources as candidate optical afterglows (Jelinek, *et al.*, *GCN Circ.* 10331) and Gemini-N discovered source A to contain a fading transient (Cucchiara, *et al.*, *GCN Circ.* 10335). A NOT image containing the three sources can be observed at <http://www.iaa.es/mates/grb100115a-not-errorbox2.jpg>.

2 BAT Observation and Analysis

The BAT position is $RA(J2000) = 3.333 \text{ deg}$ (00h 13m 19.9s), $Dec(J2000) = -0.817 \text{ deg}$ (-00d 49' 0.1") with an uncertainty radius of 4.0 arcmin (estimated 90% containment, stat+sys). The burst was a single FRED pulse with a T_{90} of about 3 seconds. There was no detectable flux above 100 keV.

3 XRT Observations and Analysis

The Swift/XRT began observing the field of Swift BAT Slew Survey (BATSS) GRB 100115A (Cummings, *et al.*, *GCN Circ.* 10325) T+40ks after the BAT trigger. The XRT data set consists of 8 ks exposure in PC mode split into two epochs: the first observation was performed at T+40 ks, while a second epoch of observations was acquired at T+306 ks. The UVOT-enhanced XRT position is $RA(J2000) = 3.36733 \text{ deg}$ (00h 13m 28.16s), $Dec(J2000) = -0.8265 \text{ deg}$ (-00d 49' 35.4") with an error of 4.0 arcsec (radius, 90% containment). A spectrum formed from the PC mode data can be fitted with an absorbed power-law with a photon spectral index of $2.0_{-0.5}^{+1.0}$. The best-fitting absorption column is consistent with the Galactic value of $3.1 \times 10^{20} \text{ cm}^{-2}$ (Kalberla *et al.* 2005). The counts to observed (unabsorbed) 0.3 keV - 10 keV flux conversion factor deduced from this spectrum is 3.4×10^{-11} (3.8×10^{-11}) $\text{erg cm}^{-2} \text{ count}^{-1}$.

The results of the automatic analysis of the XRT data are available at:
http://www.swift.ac.uk/xrt_products/00020126

4 UVOT Observation and Analysis

The Swift/UVOT began observing the field of Swift BAT Slew Survey (BATSS) GRB 100115A (Cummings, *et al.*, *GCN Circ.* 10325) 40ks after the BAT trigger. We do not detect any source at the Swift XRT position (Margutti, *et al.*, *GCN Circ.* 10326).

The 3σ upper limit in the UVOT photometric system (Poole, *et al.*, 2008) for the summed images are reported below:

Filter	Start (s)	Stop (s)	Exposure (s)	3σ UL
b	40636	46609	411	>20.19
u	40423	46395	411	>19.85
uvw1	40001	46180	824	>20.29
uvw2	40849	47260	1098	>20.99

Table 1: Magnitude limit from UVOT observations. The values quoted above are not corrected for the expected Galactic extinction corresponding to a reddening of $E(B-V) = 0.06$ mag in the direction of the burst (Schlegel, Finkbeiner & Davis, 1998).

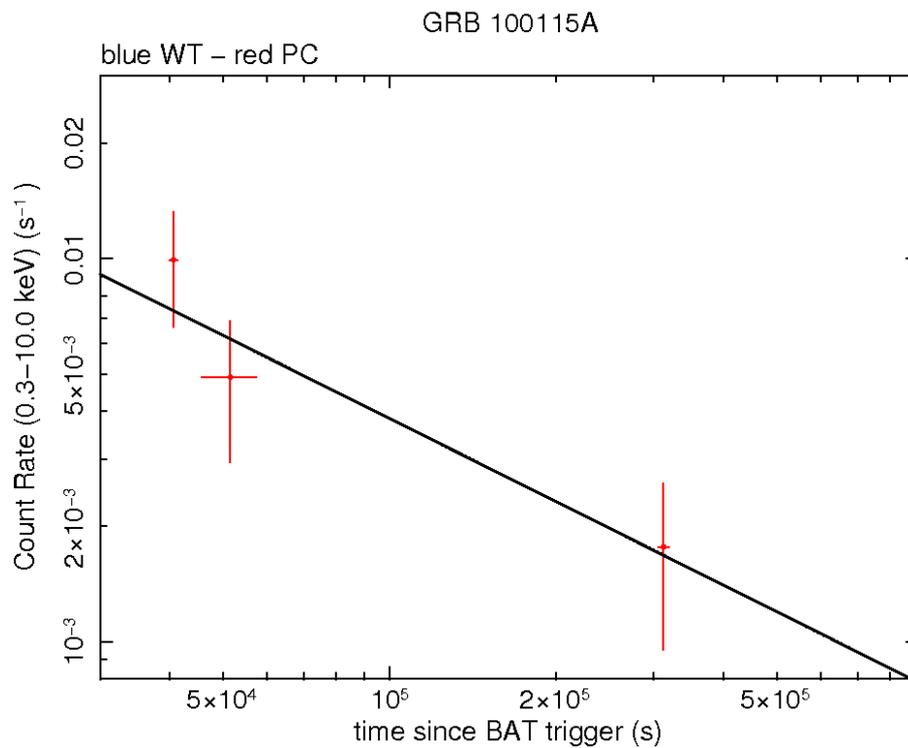


Figure 1: XRT light curve in the 0.3-10 keV band. The counts-to-observed-flux conversion factor is 1 count = 3.4×10^{-11} erg cm^{-2} s^{-1} .